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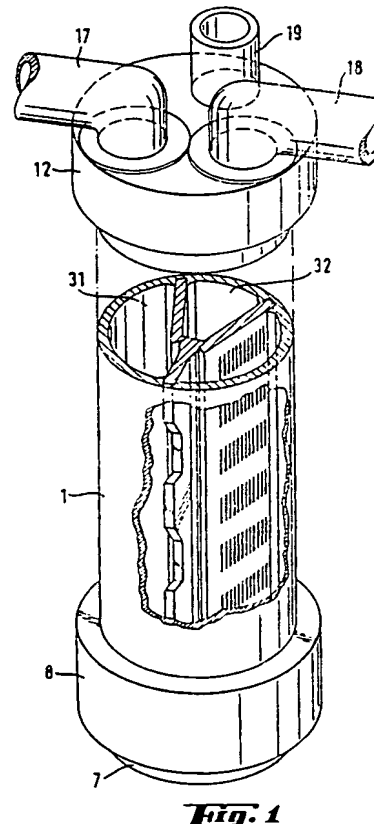
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(54) Irrigation water filter

(57) An irrigation filter comprises a housing divided by a filter element into two regions. The upper end wall of the housing has first and second apertures which respectively communicate with the two regions. The housing is rotatable relative to an end cap, which has an inlet 17, filtrate outlet 18 and flushing outlet 19 and fits over the end wall. In a first relative rotational position of the housing and end cap the inlet and outlet respectively communicate with the first and second apertures whilst in a second relative position, the inlet communicates with the second aperture and the flushing outlet communicates with the first aperture to backwash the filter element with raw water. The filter element is of Y cross-section, with one supporting limb and two filtering limbs, and it locates in grooves in the housing side and ends.



The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

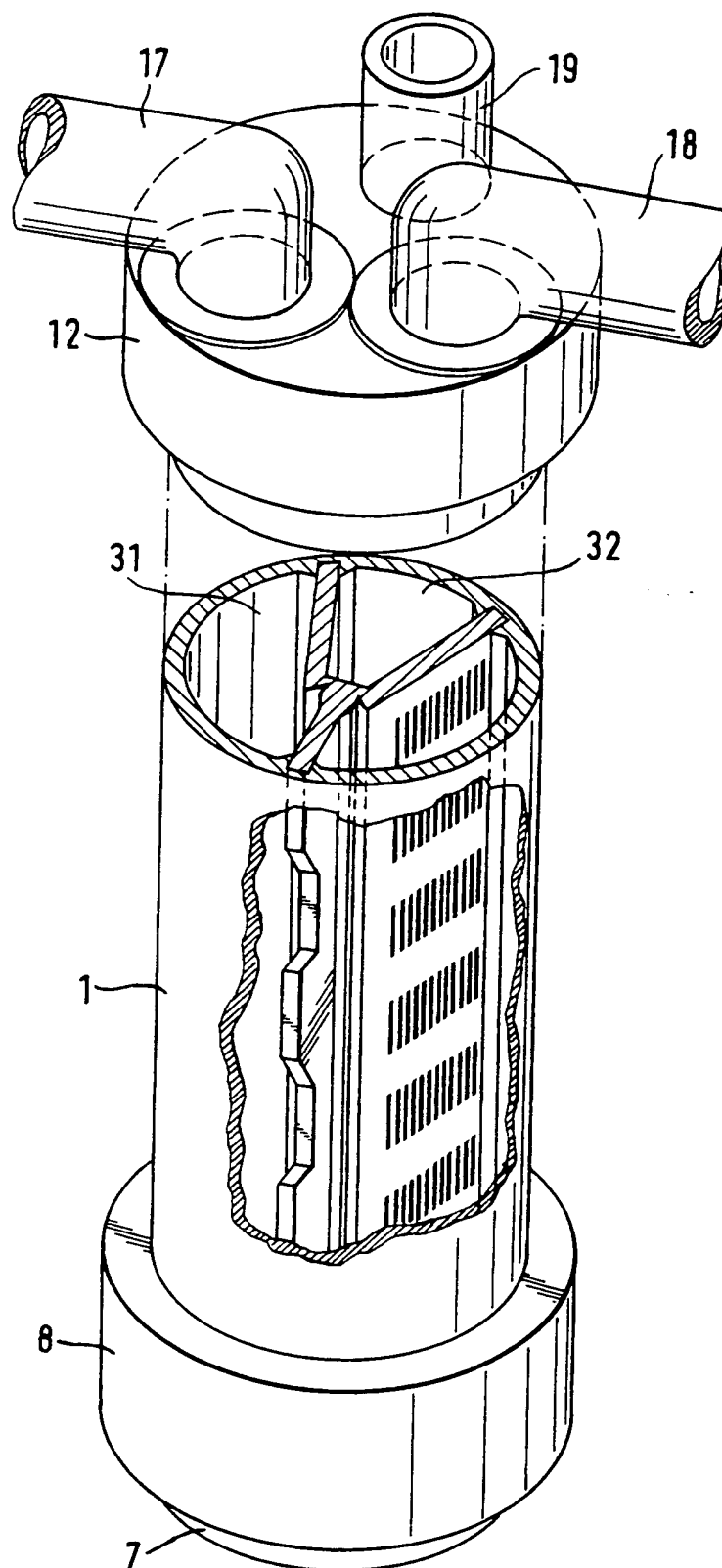
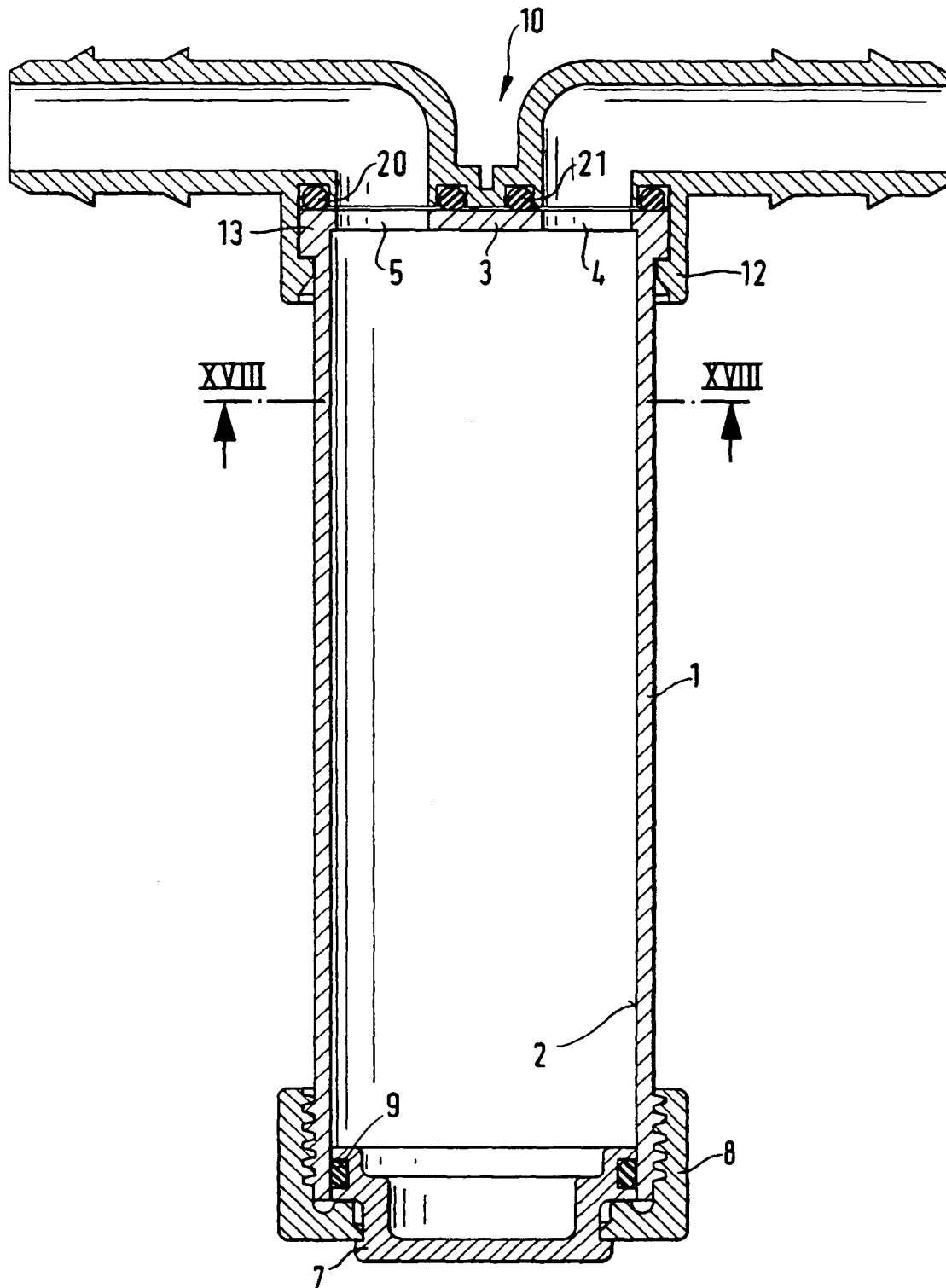


Fig. 1

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**Fig. 2**

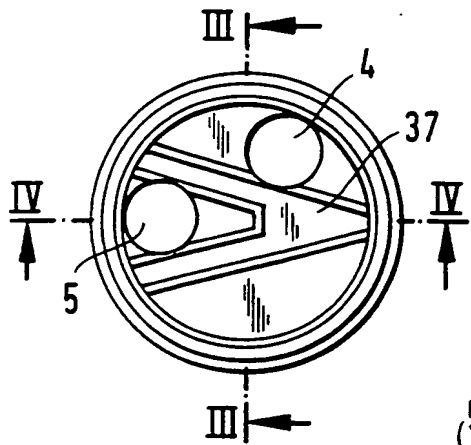


Fig. 5

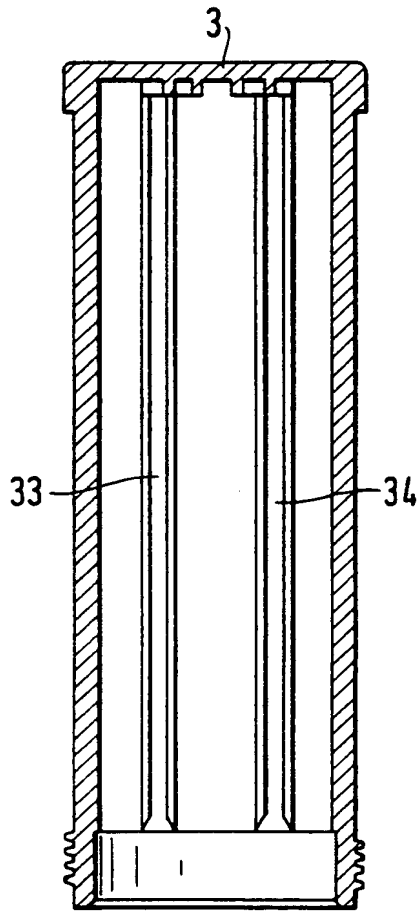


Fig. 3

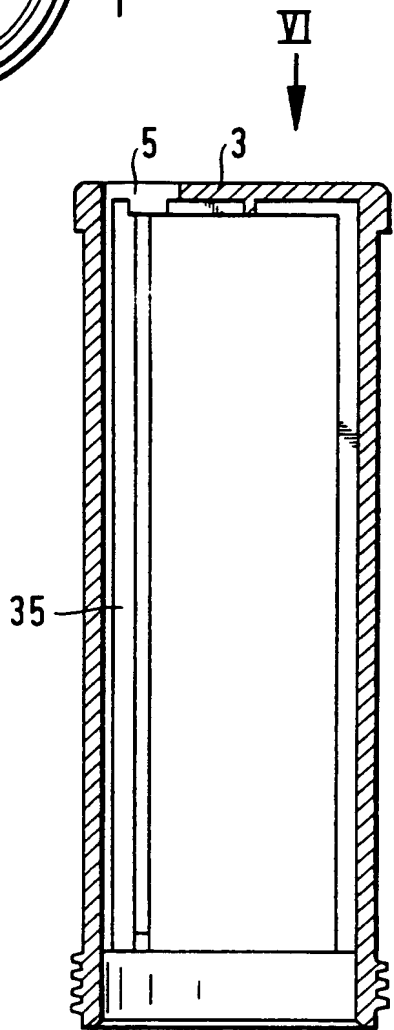


Fig. 4

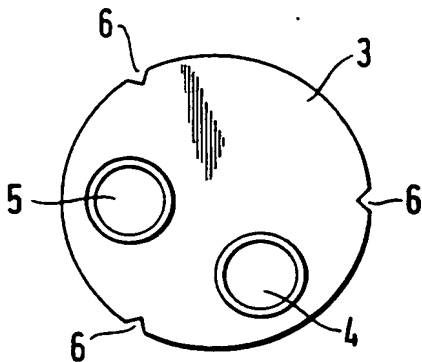


Fig. 6

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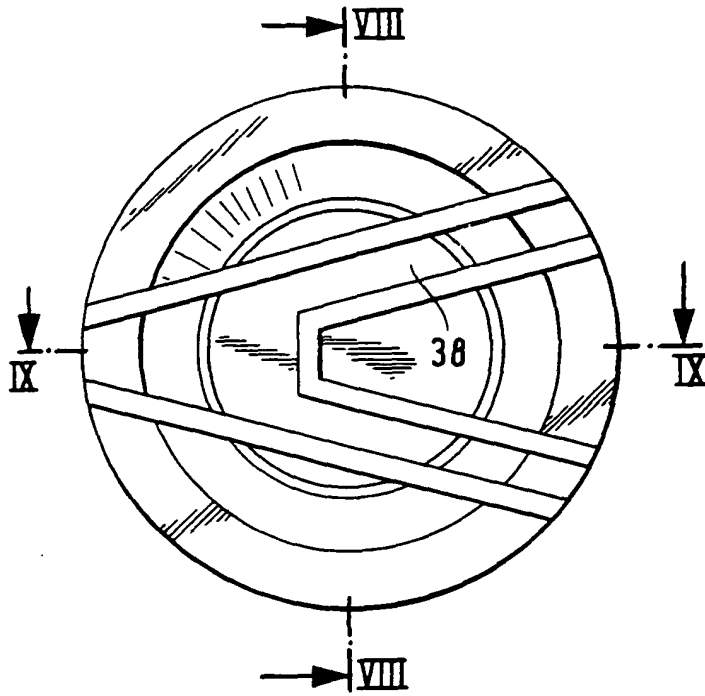


Fig. 7

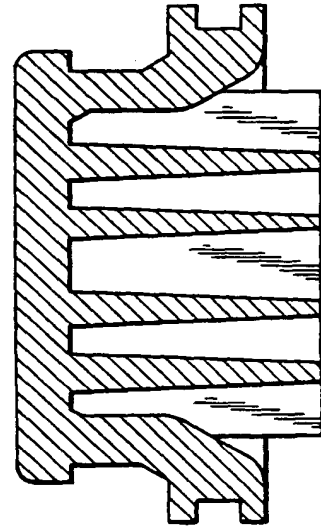


Fig. 8

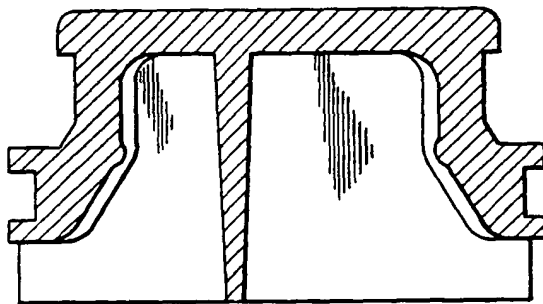
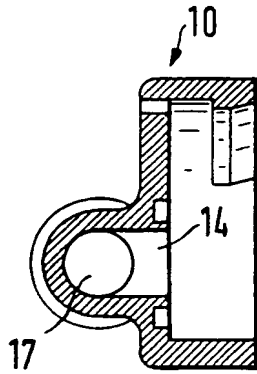
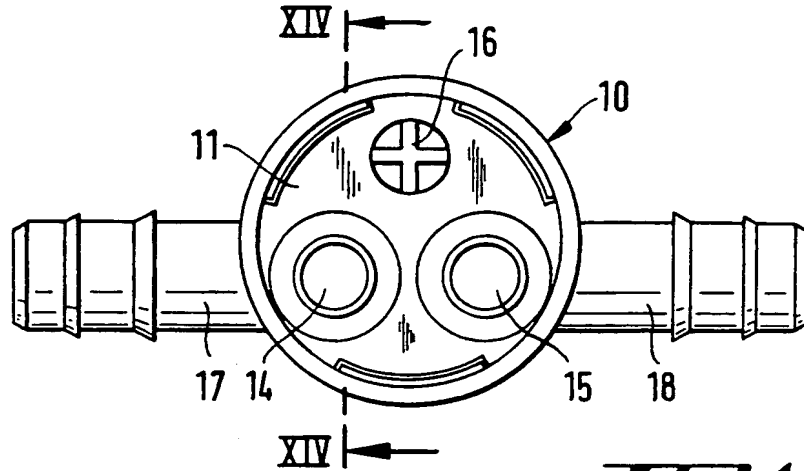
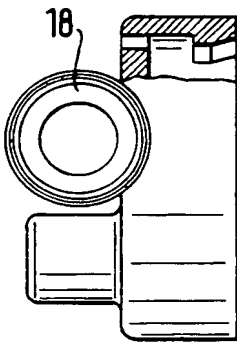
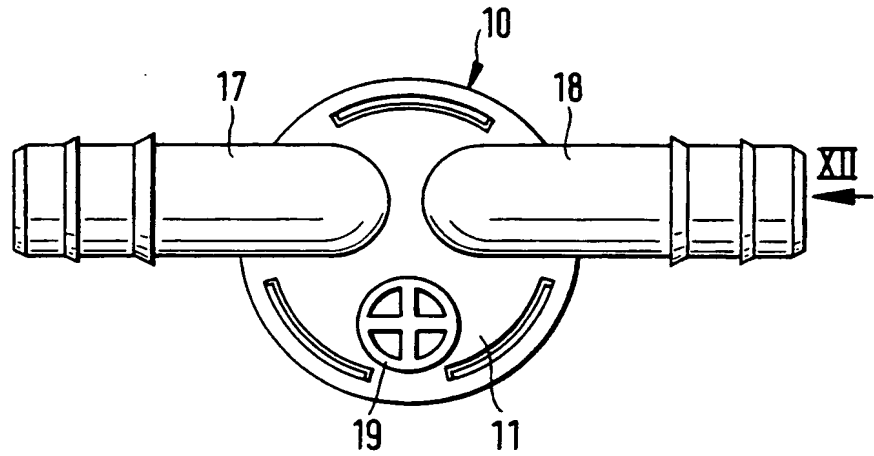
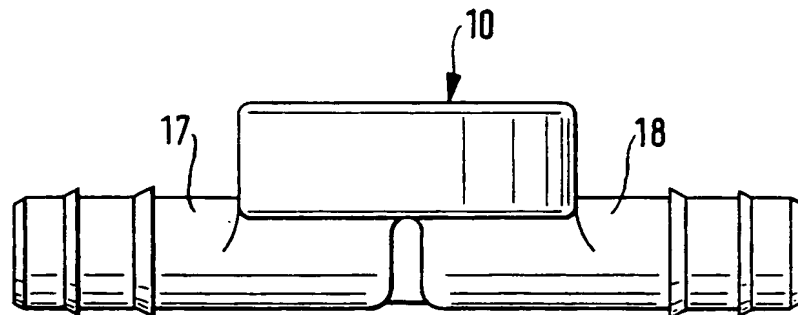


Fig. 9

**Fig. 14****Fig. 13****Fig. 12****Fig. 11****Fig. 10**

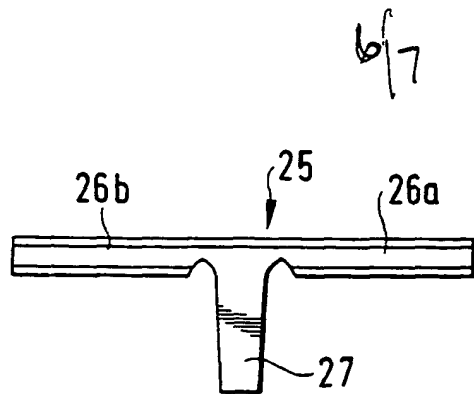


Fig. 17

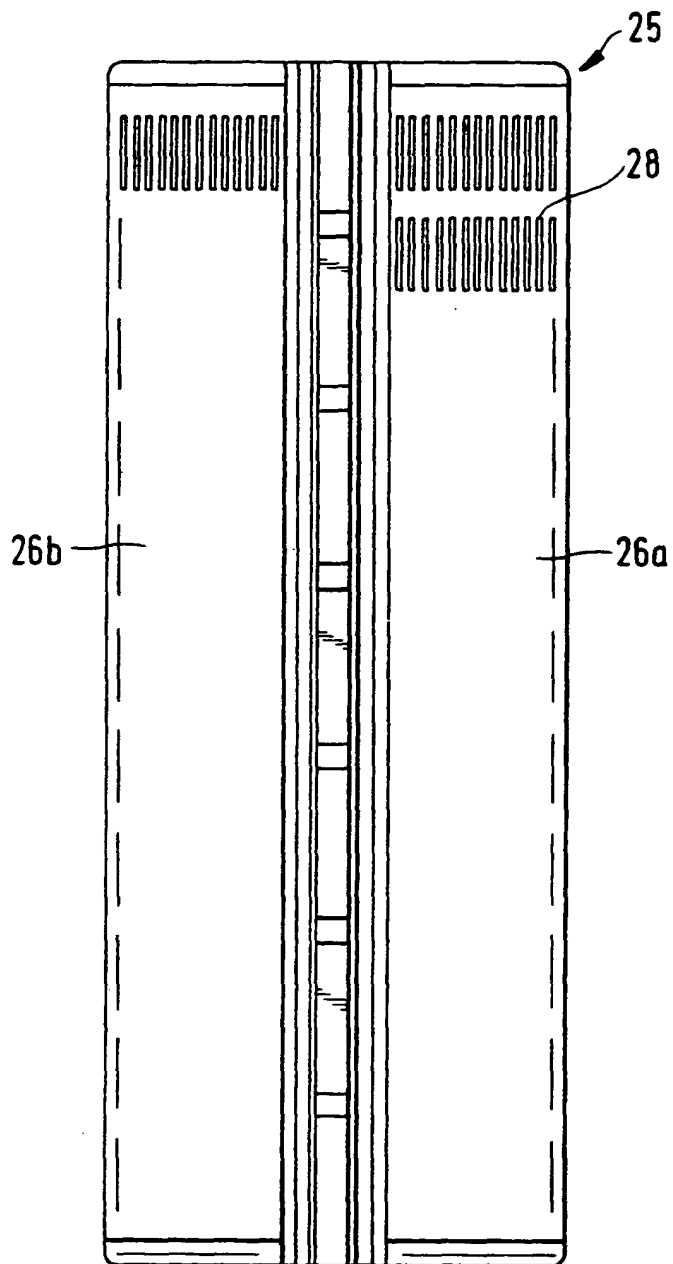


Fig. 15

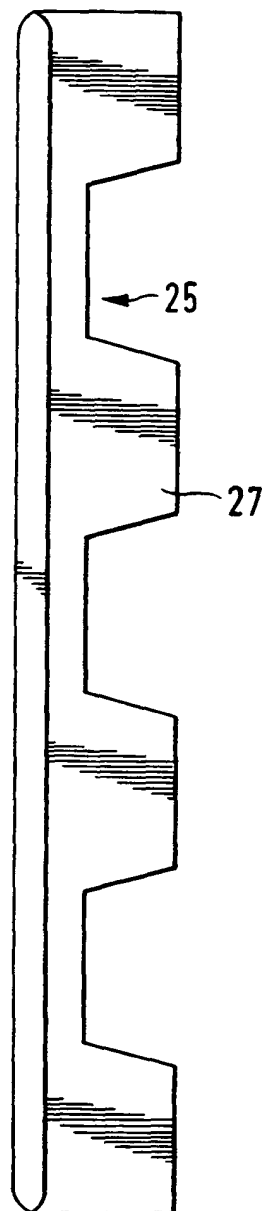
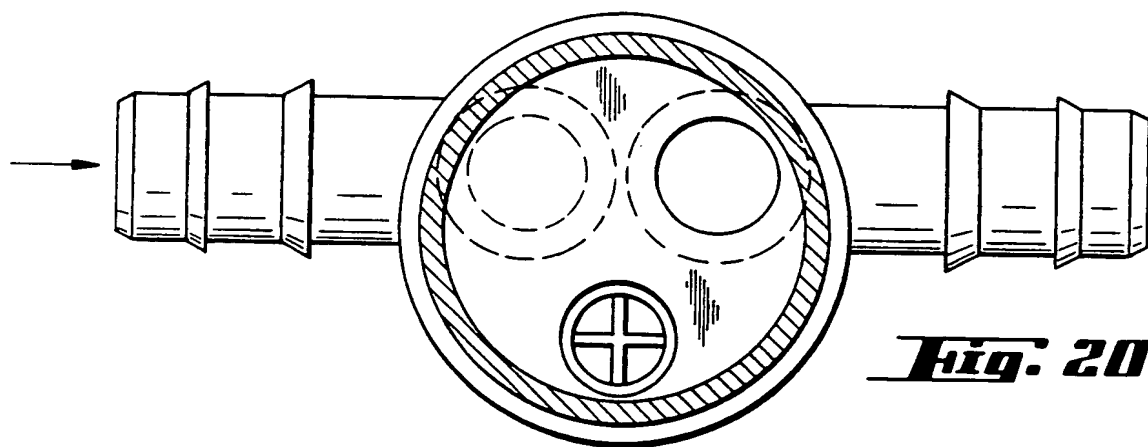
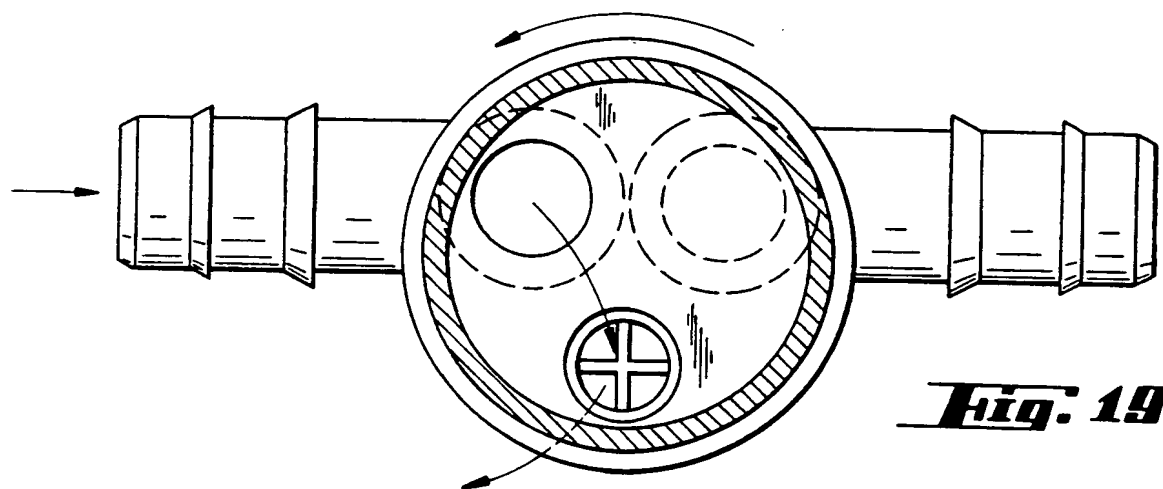
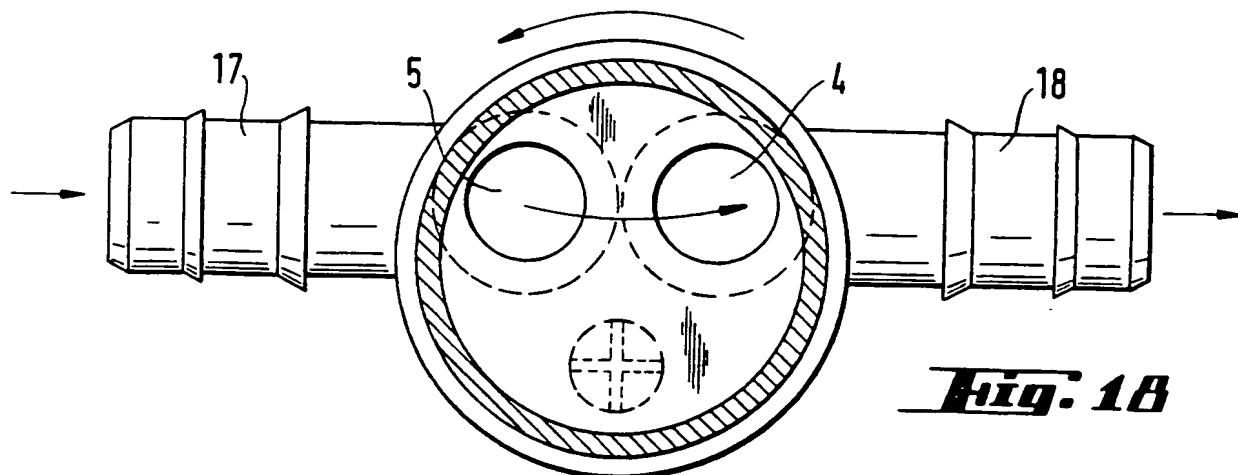


Fig. 16



SPECIFICATION

An irrigation filter system

5 The present invention relates to an irrigation filter system of a kind comprising a filter housing, a filter element located in the housing and an inlet and an outlet port of the housing such that all liquid flowing into the housing via the inlet port is constrained to pass through the filter element before passing out of the housing via the outlet port. In this way the through flowing liquid is continuously filtered. In view of the fact however that the continuous flow of liquid through the filter element results in the increasing blockage of the filter element by the contaminants or impurities entrained in the liquid and filtered out by the filter element, filter systems of this kind are usually provided with means whereby the filter element can be periodically cleaned. A common way of effecting such cleaning is to cause a backflow of liquid (i.e. a flow of liquid in a direction opposite to the normal filtering flow of the liquid). This backflowing liquid effectively flushes the blocking contaminants out of the filter element means being provided for discharging the flushing liquid.

It is an object of the present invention to provide a new and improved irrigation filter system capable of backflow flushing.

30 According to the present invention there is provided an irrigation filter system comprising a filter housing; a filter element located in said housing and defining with said housing first and second regions; an end wall of said housing; first and second apertures formed in said end wall which respectively communicate with said first and second regions; an end cap for said housing adapted to fit over said end wall so that the end cap and the housing are rotatable with respect to each other; inlet, outlet and flushing ports found in said end cap; said housing and end cap being displaceable into a first relative rotational position of said housing and end cap wherein said inlet and outlet ports respectively communicate with the first and second apertures, and into a second relative rotational position wherein said inlet port communicates with said second aperture and said flushing port communicates with said first aperture.

In accordance with a preferred embodiment, the filter element is constituted by a pair of angularly disposed filter limbs and a support limb, said limbs radiating from a common central axis, longitudinal edges of said limbs being located in corresponding grooves formed in the inner surfaces of said housing.

With such an irrigation filter system in accordance with the present invention the system can be readily passed from a filtering condition into a flushing condition and vice versa by simple manual relative rotation of the housing and the end cap.

For a better understanding of the present invention and to show how the same may be carried out in practice reference will now be made to the accompanying drawings in which,

Figure 1 is a partially broken away perspective view of an irrigation filter system in accordance with the present invention;

70 *Figure 2* is a longitudinally sectioned side elevation of the filter housing and end cap of the system shown in *Figure 1*,

Figures 3 and 4 are respectively longitudinally sectioned elevations of part of the housing shown in *Figure 2* in respectively differing angular dispositions,

75 *Figure 5* is an end elevation of the portion of the housing shown in *Figures 3 and 4* looking into the housing portion,

80 *Figure 6* is an end elevation of the housing portion shown in *Figure 4* taken from outside the housing in the direction of the arrows VI-VI,

Figure 7 is an end elevation of a closure cap of the housing,

85 *Figures 8 and 9* are respective cross-sectional views of the closure cap shown in *Figure 7* taken along the lines VIII-VIII and IX-IX,

Figure 10 is a side elevation of an end cap of the housing,

90 *Figure 11* is a plan view from above of the end cap shown in *Figure 10*,

Figure 12 is an end elevation of the end cap shown in *Figure 11* in direction of the arrows XII-XII,

95 *Figure 13* is a plan from below of the end cap shown in *Figure 10*,

Figure 14 is a cross-sectional view of the end cap shown in *Figure 13* taken along the line XIV-XIV,

Figure 15 is a plan view of a filter element used in the filter system shown in *Figure 1*,

100 *Figure 16* is a side elevation of the filter element shown in *Figure 15*,

Figure 17 is an end elevation of the filter element shown in *Figures 15 and 16*, and

105 *Figures 18, 19 and 20* are respective cross-sectional plan views of the housing and end cap shown in *Figure 2* taken along the line XVIII-XVIII in three differing relative dispositions of the end cap and housing.

As seen in the drawings, the irrigation filter system comprises a cylindrical filter housing 1 having an open, externally threaded, end portion 2 and, at its opposite end an integrally formed end wall 3 in which is formed a pair of throughgoing apertures 4 and 5. The periphery of the end wall 3 is formed with three equally angularly distributed notches 6.

115 An end closure 7 fits into the end portion 2 of the cylindrical housing 1 and is screw retained in position by means of a screw collar 8 which is screwed onto the externally threaded end portion 2. A sealing ring 9 serves to seal the end closure 7 with respect to the end portion 2 of the cylindrical housing 1.

120 An end cap 10 comprises a circular end plate 11 from which depends a cylindrical skirt 12 which is snap fitted around a flanged end 13 of the cylindrical housing 1 so as to be capable of relative rotational movement with respect to the cylindrical housing 1.

130 Formed in the end wall 10 is an inlet port 14, an outlet port 15 and a flushing port 16. The inlet and

outlet ports 14 and 15 are formed integrally with coupling nipples 17 and 18 whilst the flushing port 16 is formed integrally with a flushing outlet 19.

Surrounding the inlet and inlet ports 14 and 15 are sealing rings 20 and 21 which bear against the end wall 3.

Disposed within the filter housing 1 is a filter element 25 which, as shown in Figure 1 and Figures 15, 16 and 17 of the drawings is formed of a pair of filter limbs 26a and 26b and a support limb 27. The limbs 26a, 26b and 27 radiate from a common, central axis so as to be capable of pivotally flexing thereabout. The limbs 26a and 26b are formed with successive rows of throughgoing narrow filtering slits 28 whilst the support limb 27 is of substantially castellated construction.

As seen in Figure 1 of the drawings the filter element 25 is inserted and retained within the cylindrical filter housing with the filter limbs 26b and 26a flexed above their axis so as to form a V-shaped structure with the support limb 27 projecting outwardly from the apex of the V. In this way the filter element 25 effectively defines within the cylindrical filter housing and together with the wall of the filter housing a first region 31 and a second region 32, the latter constituting the region of the housing defined between the inner surfaces of the filter limbs and the housing, the first region 31 constituting the remaining volume of the housing on either side of the support limb and separated from the second region by the filter limbs.

The outer longitudinal edges of the filter limbs and the support limb are located within respective grooves 33, 34 and 35 (see Figures 3 and 4) formed in the internal surface of the filter housing. The uppermost edges of the filter and support limbs are located in corresponding grooves 37 formed on the inner surface of the end wall 3. Finally the lowermost edges of the filter and support limbs are located within corresponding grooves 38 defined within ridges formed on the inner surface of the end closure 7.

The provision of these locating grooves 33 to 38 ensures that, once the filter element is disposed within the filter housing it is securely retained therein and cannot rotate with respect to the filter housing.

The aperture 4 formed in the end wall 3 communicates with the filter housing region 31 whilst the aperture 5 communicates with the filter housing region 32.

Reference will now be made to Figures 18, 19 and 20 of the drawings which illustrate the use of the system. As seen in Figure 18 of the drawings when the cylindrical housing is rotated with respect to the end cap so that the aperture 5 communicates via the inlet port with the inlet nipple 17 and the aperture 4 communicates via the outlet port with the outlet nipple 18 water flowing into the filter system via the inlet nipple 17 passes through the aperture 5 into the region 32 and is then filtered by passage through the filter limbs into the region 31 from which it passes out of the aperture 4 and the outlet nipple 18. Thus, in the relative disposition of the filter housing and end

cap shown in Figure 18 of the drawings the water passing into the inlet nipple 17 is filtered by the filter element, the filtered water passing out of the outlet nipple 18.

When now the filter housing is rotated with respect to the end cap in an anti-clockwise direction into the position shown in Figure 19 of the drawings wherein the aperture 5 is aligned with the flushing port 19 and the aperture 6 is aligned with the inlet port water flows through the inlet nipple 17 through the aperture 4 into the region 31 and from there as a form of backflow through the filter limbs into the region 32 and out of the flushing port 19. Thus a reverse flushing flow takes place through the filter limbs flushing away entrained contaminants out of the flushing port.

Finally and upon further anti-clockwise rotation of the filter housing into the position shown in Figure 20 of the drawings wherein the aperture 4 is aligned with the flushing port and the aperture 5 is aligned with the outlet port the inlet port is effectively blocked and in this way no flow out of the inlet nozzle takes place.

By virtue of the position of the peripheral notches 6, it can be readily and manually detected when the filter housing has been rotated into any of the positions shown in Figure 18, 19 and 20 of the drawings.

The irrigation filter system just described with reference to the drawings constitutes a simple and economical system for effecting filtration of irrigation fluids and, for the simple, manually operable, cleaning of the filter elements.

100 CLAIMS

1. An irrigation filter system comprising a filter housing; a filter element located in said housing and defining with said housing first and second regions; an end wall of said housing; first and second apertures formed in said end wall which respectively communicate with said first and second regions; an end cap for said housing adapted to fit over said end wall so that said end cap and said housing are rotatable with respect to each other; inlet, outlet and flushing ports formed in said end cap; said housing and end cap being displaceable into a first relative rotational position of said housing and end cap wherein said inlet and outlet ports respectively communicate with said first and second apertures, and into a second relative rotational position wherein said inlet port communicates with said second aperture and said flushing port communicates with said first aperture.

2. An irrigation filter system according to Claim 1 wherein said end wall is furthermore formed with a sealed end portion and wherein said housing and said end cap are displaceable into a third, relative rotational position of said housing and said end cap, in which said inlet port is located opposite said sealed end portion.

3. An irrigation filter system according to Claim 1 or 2 wherein said filter element is constituted by a pair of angularly disposed filter and support

limbs, said limbs radiating from a common central axis, longitudinal edges of said limbs being located in corresponding grooves formed in the inner surface of said housing.

5 4. An irrigation filter system according to Claim 3 wherein said housing is provided at an end thereof remote from said end wall with a closure element releasably secured to said housing.

10 5. An irrigation filter system according to Claim 4 wherein both said end wall and said closure element are formed with aligning grooves adapted to receive the opposite ends of said filter element.

6. An irrigation filter system substantially as hereinbefore described by way of example and
15 with reference to of the accompanying drawings.

7. For use in an irrigation filter system according to any one of the preceding claims a filter element comprising a pair of elongate filter limbs joined together at a central axis from which projects an elongated support limb, said limbs being
20 capable of flexing about said axis.

8. A filter element according to Claim 7 wherein said filter limbs are formed with a plurality of longitudinally spaced apart throughgoing slits.

25 9. A filter element according to Claim 8 wherein said support limb is formed with a succession of longitudinally spaced apart discontinuities.

10. A filter element substantially as hereinbefore described by way of example and with reference to the accompanying drawings.
30

11. Any novel integer or step, or combination of integers or steps, hereinbefore described and/or shown in the accompanying drawings irrespective of whether the present claim is within the scope of,
35 or relates to the same or a different invention from that of, the preceding claims.